

RHU management for planetary probe thermal control

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Radioisotope Heater Unit is of major benefit for deep space missions:

- Constant (almost) heating dissipation all along the mission,
- No impact on power budget
- Easy implementation
 - § Small volume
 - § Easy spreading inside the probe
 - § No wiring

This device allows simple and flexible thermal control for all of the deep space phases of the mission.

However, during the initial phases of the mission, where the thermal environment is relatively warm with regard to the deep space one, presence of RHU can induced severe constraints on the probe.

The number of RHU and their implementation inside the probe is defined considering the constraints in the coldest environment. During integration of the probe on ground, the particular configuration of entry probes could induce overheating, as the heat is trapped within the probe. Dedicated devices should be implemented for the on-ground phases, including the operation on the Launcher.

A comparison of the philosophy followed for different missions will be performed, including the HUYGENS probe to TITAN, and missions to Mars as the NASA MER, and the CNES NETLANDER mission for which ALCATEL was EDLS prime contractor before the mission cancellation.